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ABSTRACT

Higher education will be analyzed in greater depth in the future than at any time in the past. Comprehensive information systems will grow and be used for planning, budgeting, and coordination of all postsecondary education supported by public funds. As these information systems develop, educators and legislators must use the information to make the necessary value judgments that will strengthen higher education and the society it serves. This document presents 4 papers given at a conference of the ACT that deal with the statewide planning for the future of higher education. The papers are: "Long-Range Planning in a State System of Higher Education" by Arthur D. Browne; "The Uses of Management Information Systems in State Systems of Higher Education" by Ben Lawrence; "The Role of the State Scholarship Program in the State System of Higher Education" by Joseph D. Boyd; and "Comprehensive Information Systems for Statewide Planning in Higher Education: Some Prospects and Critical Concerns" by Fred F. Harcleroad. (HS)

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Comprehensive Information Systems for Statewide Planning in Higher Education

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PREFACE

All states provide for the coordination of the often diverse postsecondary educational institutions supported by public tax funds. Until recent decades state legislatures served as the coordinating bodies, even though the first coordinating board was formed in 1784 (the Board of Regents of the University of the State of New York). Gradually legislatures established agencies to coordinate activities and recommend budgets. By the end of World War II, 18 such agencies had been developed. By 1970, only four states were without some formal legislation establishing an official coordination agency or board: Tennessee, Indiana, Nebraska, and Vermont. Indiana and Nebraska have voluntary associations which provide for communication.

Of the 46 legislatively established boards, a continually increasing number are governing agencies, in some cases including all of the public education from preprimary through postdoctoral and continuing-adult education. These varied boards meet the needs in individual states and have many diverse functions. They must provide, however, for long-range planning, assessment of need for new or additional educational campuses or programs, for review and recommendation of annual budgets, and, in most cases, for review of capital outlay expenditures involving both state and federal funds. In some instances, coordinating boards with strong staff members have gone beyond their de jure powers and, in fact, perform many of the control functions of governing boards.

The advent of statewide agencies, plus financial exigencies and demands for maximum efficiency in the use of funds, have led to the need for comprehensive information systems in higher education. In order to review and analyze development of such information systems, The American College Testing Program convened in 1970 a seminar of officials responsible for the development of statewide higher education agencies and state scholarship programs. The animated discussions during this seminar were triggered by three prepared papers which are made available to the general educational public through this special report. In addition, a few of the important and critical points raised in the discussions are presented in a brief concluding section.

Higher education will be analyzed in greater depth in the future than at any time in the past. Comprehensive information systems will grow and be used

for planning, budgeting, and coordination of all postsecondary education supported by public funds. As these information systems develop, educators and legislators must use the information to make the necessary value judgments which will strengthen higher education and the society it serves. This small report is designed as another aid to both educators and legislators as they consider these critical problems.

Fred F. Harcleroad
President

Iowa City, Iowa
August 1971

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LONG-RANGE PLANNING IN A STATE SYSTEM OF HIGHER EDUCATION

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An Emerging Concept: The Identity of State Systems of Higher Education

There are 50 state systems of higher education in the United States. Each of these systems comprises all of the activities supported by state funding for the delivery of higher education services to the population residing within a state. Most of our state systems of higher education have evolved from piecemeal, almost random actions of the past, tempered by political influence, and maintained by a modicum of planning. As a result, some states have well-designed formal organizations of statewide higher education services; others are scarcely aware that the aggregate of disjointed services and disconnected institutions constitutes a "state system."

It is important to differentiate the totality of higher education services provided by a state from the administrative systems of higher institutions within a state. A state may contain several state systems of higher institutions such as, in Illinois, the University of Illinois complex, the Southern Illinois University campuses, the Board of Regents' institutions, and the Board of Governors' institutions. All of these combined, plus all other state-supported post-high school activities, comprise the state system of higher education.

The distinctions between public collegiate or university systems and state systems of higher education services are more than just structural. They also constitute differences of objectives, perspectives, and activities to be described later in this paper.

In nearly all states, a single institution or a system of institutions is only one vehicle for the delivery of educational services in the state system of higher education. The combination of all state-funded institutions and services creates, formally or informally, a total structure–a gestalt–with interactive relationships and effects far different from the mere aggregate of the components. This interactive effect can be demonstrated. If the major university of a state, for example, were radically changed by such means as either closing it or building new campuses, eliminating or doubling its tuition, broadening or restricting its admissions–any such change in one institution would affect the distribution and mix of students in all other institutions within the state, as well as alter the availability of educational opportunity to the population of that state.

Commonality

The 50 state systems of higher education services have several common characteristics which tend to prescribe the dimensions of these systems.

1. Population–One essential component of the systems is the total population of the state. Higher education services should extend throughout the state, reaching from the cradle to the grave, from the ghetto to suburbia, and benefiting the academically limited, as well as the intellectually gifted. If the state succeeds in its stated goals for higher education, it usually touches all people in some way through its higher education services. Unfortunately, for a variety of reasons, the services are sometimes restricted to only a narrow spectrum of the population–the college-bound youth–as the group to be served.

2. Policy formulators–Regardless of the arrangements of governing and coordinating mechanisms provided in a state, the key decision makers–the final authorities–in all state systems of higher education are the state legislators. Although the electorate exercises remote control and certain state government executives, particularly the Governor, wield varying amounts of power, the legislature becomes the immediate point of policy impact in delivering, or withholding, state higher education services.

The degree to which the legislature relies upon, or ignores, policy recommendations from the higher educational community is a critical and sensitive

factor in determining the stability and effectiveness of state systems of higher education. The Campus-Capital relationship is becoming increasingly strained at this time of continued student unrest, burgeoning higher education budgets, and growing antipathy to institutional decisions.[1]

3. Institutional services–Another common characteristic of state systems of higher education is their dependence upon colleges and universities as the primary vehicles for delivering the state's post-high school services. In addition to traditional institutional patterns–universities, state colleges, community colleges, technical institutes, and extension units–post-high school services may be provided through such ancillary operations as museums, historical societies, and state training programs of one type or another. Further comments on the organizational pattern of state services appear later in this paper.

4. Service objectives–The overriding concern of the state system of higher education is the production of educational services to benefit the general welfare of the state, as well as the individuals therein. Heavy emphasis is placed on the possible economic returns of higher education to the state's investment. The "cost benefits" to be derived become a vital measure of accountability by the state system.

In contrast with typical academic objectives of intellectual development, the state system emphasizes pragmatic goals such as preparation for job placement and individual productivity in the community. The system tends to place higher priority upon immediate returns to the state through applied research rather than upon long-term benefits of basic research. Contrasted with its academic institutions, the state system tends to value cash rather than culture, economy over quality, and mass education instead of elitism. It subscribes to functionalism rather than rationalism, Jacksonian rather than Jeffersonian principles, and a watchtower rather than ivory tower role.

5. Funding patterns–The dimensions of the system are greatly dependent upon the economy of the state. Available revenues, together with competing services in the areas of health, welfare, justice, government, law enforcement, etc., tend to prescribe the volume, as well as the quality, of higher educational services in the state.

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[1]For documentation of these sensitivities, see the following publication: Heinz Eulau and Harold Quinley, *State Officials and Higher Education* (New York: McGraw-Hill, 1970).

Diversity

Within these broad common patterns, there exists an amazing degree of diversity among the 50 state systems of higher education. This diversity is readily apparent in quantitative differences relative to size and scope of operations among the 50 states.

For example, one state utilizes more than 30 totally state-supported institutions to generate higher education services, while another state supports only one institution for this purpose. One state appropriates two-thirds of a billion dollars annually for higher education operations, but another state provides only 10 million dollars for the same purpose. The state's effort to support higher education, as measured by the percent of personal income spent for public higher education in the state, is as much as 10 times greater in one state than in another. The total number of resident enrollments served by one state can be 200 times greater than the number served in another state. Even when measured by the ratio of enrollments to college-age population within the state, the accommodation of students differs greatly among the states. For example, the attendance of post-secondary vocational students varies from three-tenths of one percent of the age-group population in one state to nearly 15 percent in another state.

But diversity among state systems goes well beyond numbers. Their philosophies, policies, and performances present a markedly different array of educational opportunities to citizens of one state as compared with another. These differences are further illustrated as we turn our attention to system planning.

State System vs. Institutional Planning

Planning for a state system of higher education services should not be confused with planning for a system of higher institutions. Historical developments indicate the difficulty in sharply delineating these two types of planning.

Higher education planning is historically rooted in institutional analysis. The first analytic books concerning management problems in higher education appeared around the turn of this century and were written by such notable university presidents as Thwing (1900), Gilman (1898), Harper (1905), and Elliot (1908). These early treatises were of the "arm-chair" variety, growing out of the rich personal experiences of their eminent authors. Then educators began turning to more effective scientific methods of measurement in

surveying the higher education scene. Commencing with the Oberlin Study of 1908, the survey movement in American higher education evolved rapidly thereafter. Educational planners such as Works, Strayer, Reeves, Russell, Evenden, and others conducted hundreds of collegiate surveys during the two decades prior to World War II. Most of these studies concentrated upon the identification and measurement of institutional characteristics. Even the surveys of denominational systems or state systems of higher institutions focused largely upon institutional operations, giving only minor attention to system-wide dynamics.

Nomenclature for planning studies has changed somewhat in recent years. During the 1930s, "surveys" turned into "evaluation studies," emphasizing measurement in terms of institutional objectives. Then the term, "master plan," popularized by the California Master Plan in 1959-60, applied to many statewide studies thereafter. Throughout this metamorphosis, however, institutional analysis has been the primary vehicle of such planning. But the time has come for planners to recognize the vital need to deal with the varying dimensions and relationships of system factors and their statewide impacts.

Interestingly, if one were to compare the techniques and contents of a classic study undertaken 40 years ago, such as the University of Chicago Survey (Reeves et al., 1933), with the best of institutional master plans today, one would find very few sophistications of planning developed during the last four decades. The advancements made are primarily due to an increased ability to manipulate complex sets of data through computers. As a result, we face the dawn of a major breakthrough in planning via simulation techniques. If, and when, the dynamics of institutional operations are sufficiently understood to exercise finesse in model prediction, this technique will revolutionize collegiate planning. Still, such advancements will bring us only to the threshold of system simulation, where the analogues become even more complex and less predictable.

Differences in Approach

Experienced planners are well aware of the fiercely competitive natures of institutional and state approaches to planning. The two types of planning should be reciprocal and complementary, but too frequently this is not the case. In general, state system planning is quantitatively oriented, while institutional planning is more concerned with qualitative assessment. State planners work with parameter measurements, while institutional planners deal with descriptive data pertaining to operations. Institutional plans are typically

concerned with student selection, curriculum revision, faculty recruitment, institutional development, funding requirements, campus planning, research development, and many other aspects of institutional operations. On the other hand, state planning must deal with variables such as the availability of statewide opportunities for education, unmet manpower needs, determination of differential functions among the institutions, faculty demand and supply, budget allocations, capital outlay priorities, interinstitutional projects, and campus-state relationships–to list only a few of the perennial concerns of the state planner.

The two types of planning manifest diverse priorities as they address themselves to the concerns of different constituencies. System plans are sensitive to public pressure–to the legislature and taxpayers–but institutional plans relate more to the problems of students, faculty, administrators, and, sometimes, alumni.

Frequently, there develops an "irreality" in state system planning as attempts are made to interface with institutional planning. A cat-and-mouse game develops as the state planner seeks inputs from the academic community. Policies are negotiated rather than based upon reliable data sources. For the most part, institutional officers would prefer to ignore the state plan when it inhibits rather than helps, but nevertheless, they are willing to suffer its inconveniences if it offers a facade of cooperation which protects them from further intrusions of state controls. A true "mesh" of state and institutional plans seldom occurs.

Planning Participants

One of the sensitive issues in state system planning is the determination of who should participate in the planning project. Traditionally, four types of participants play key planning roles:

1. institutional representatives,

2. experts from outside the educational system,

3. policy formulators–trustees, coordinating board members, legislators–and

4. citizens-at-large.

A grid could be constructed to illustrate the nature of these planning participants:

	Professionals	Noneducators
Insiders	Institutional personnel	Policy-makers
Outsiders	Outside consultants	Citizens-at-large

Academic officials place greater trust in professional participants, particularly in their own institutional personnel, who understand the complexities of institutional management and operations. All too frequently, when university experts complete an institutional study—one that may be technically sound and academically progressive—it is likely to be criticized by state officials as an in-house effort to protect or enhance the university guild.

Increasingly, state planners are seeking advice from outsiders who, presumably, exercise more objectivity and have a broader perspective of the overall social and economic needs of the population. Citizens-at-large are being called in, along with outside consultants, to advise policymakers at the state level. This planning trend indicates a lessening of concern for the collegial aspects of policy formulation and a striving for perspectives which are not institutionally bound.

Ideological Differences

Even more basic to the chasm which separates state and institutional planning are the underlying philosophical differences. The state system of higher education grows out of a bureaucratic setting in which an attempt is made to establish hierarchical relationships with accountability to a central authority. The institution, on the other hand, is a collegial organization of scholars who, steeped in the traditions of academic freedom, strive to exercise legislative, executive, and judicial functions within the institution. Planners at both levels face an impossible task in attempting to integrate these two basic orientations.

Administrators, governing boards, and state coordinators are currently torn by diametrically opposed demands of two power groups: the faculty representing the collegium and the legislature representing the bureaucracy. These two ideologically opposed groups appear to be on a collision course which may well shake the foundations of academe even more than the

current student unrest. In such a confrontation, the legislature, through its control of both legal power and purse strings, is almost certain to dominate. Although state systems of higher education are more likely to endure these convulsions than institutions, both may be drastically altered.

Future Directions of State Planning

Centralization

Currently, state systems of higher education are embodied in widely differing patterns of organization. Twenty-one states utilize coordinating agencies which plan higher education policies, 18 states employ statewide boards which govern as well as coordinate, 7 states rely upon a single agency to control all levels of public education, and 4 states have no statewide authority to plan or govern higher education. Great diversity exists within each of these types of controlling agencies.

There is no model organization for planning statewide higher education services because such an agency, to be truly effective, would exercise controlling powers which, at this point in time, would be resisted by institutions and would not be delegated by legislatures.

When the states were confronted with unprecedented expansion of post-high school enrollments during the years after World War II, coordinating agencies were created to plan for unity and order in a context of diversity and empire-building. The legal powers of these agencies were restricted to protect the traditional academic freedoms and autonomy of universities. In spite of these limitations, the coordinating boards have produced salutary plans and policies aimed toward the orderly development of state higher education services.

Public officials are becoming impatient with the results. They criticize the coordinating boards for avoiding hard decisions on perturbing issues and, even more seriously, for creating policies which are not implemented or followed. Furthermore, from the public official's viewpoint, more intensive problems than enrollment expansion now plague the states, such as militant students who flaunt the law, independent faculties who forsake instructional responsibilities for other interests, and spiraling budgets which preclude tax curtailments. Coordinating agencies are neither empowered nor equipped to deal with these problems. They can be only halfway houses in producing the kinds of rehabilitation demanded by some legislators.

State controls over public higher education will be strengthened in the future. Evidence of this tendency may be observed in the fact that, for the first time since 1945, three states created statewide governing boards last year. Whatever form of organization evolves as a vehicle for dealing with the emerging problems of academe, undoubtedly it will represent a centralization of state controls over higher education services. Statewide planning will reflect these controls.

Responsiveness

The central planning and controlling agency must become more responsive to state government, particularly regarding legislative direction and programs. Admittedly, the alliance between the academic structure and state government may be a shaky one, fraught with the possibility of political domination. Resourceful leadership is demanded on the part of state planners in attempting to decipher the public interest as represented by the state legislature and to interpret legislative tolerance for academic policies. The hazard of falling into a political alignment and becoming enmeshed in party politics is one of the grave risks faced by statewide planners.

System Outputs

Although state systems will always rely upon institutional data and institutional outputs as planning measures, they must design statewide information systems which are both uniform and comprehensive. Currently, information systems for state planners are sorely handicapped by lack of a taxonomy for the outputs of higher education systems. Doesn't it appear strange that we have not developed widely accepted measures of the effectiveness of state systems of higher education? Institutional outputs, such as degrees awarded, students enrolled, and public service projects produced, tell only part of the story. The important outputs of a state system of higher education are registered in providing manpower for a vigorous economy, informed citizens for sensible social action, higher ethical and moral values for humanistic and cultural advancement, greater ecological sensitivity for environmental improvement, and a host of other possible societal benefits. Obviously, the problem of assessing causal relationships between higher education services and a changing society is compounded with so many contaminations that the identification of measurable outputs is very difficult. Still, evidence of these types of effective service-oriented results are demanded by resource allocators in the legislature.

It appears, then, that state planning will move increasingly toward a consumer-oriented approach to determine state needs. In this venture, the state planning agency must be able to draw upon the services of the many agencies involved in identifying state needs.

In the future, system planners are likely to broaden the basis of planning, giving more attention to their clients' demands than to institutional capabilities. As long as state governments, which now provide 60 percent of all higher education funding, are the primary source of financing, state planners will tend to stress benefits to the state in planning educational services. If, on the other hand, major funding responsibilities shift to the federal government, then state boundaries will become less important in decision making. Further speculation concerning who will control higher education would be raised if the current controversial proposals for full-cost tuition become widely accepted so that the student pays the majority of his educational costs.

As educational services become more critical and more widely used by the consuming population, these services will become less institutionalized. Planners may look increasingly toward private colleges and universities for contractual services to supplement programs in the public institutions. State systems may eventually turn, in part, for services from the large business organizations which are now gearing up for action through modern educational technologies. Particularly, if the recent groundswell of legislative apprehension toward the education establishment continues, with further demands for economy and accountability in public higher education, states may look to private industry for contracted educational services on the basis of stated performance criteria.[2]

A Search for Models

A new model for planning state education services is desperately needed. The economic model is currently popular because the policy formulators associated with state systems identify most easily with the business-industrial complex and its modes of operation. But the economic model has grave shortcomings in dealing with educational variables, particularly its

[2]A prototype of such contractual arrangements is the Texarkana Project in which Dorsett Educational Systems, employing programmed learning via teaching machines, is attempting to increase the performance of students needing remedial work in math and reading.

inability to discriminate the complex differences which characterize educational products and services. What is needed is an educational model directly related to educational programming, not only for institutional outputs, but for system outputs in the state. Hopefully, with the aid of the computer, such models can, and will, evolve in the future.

Summary

State systems of higher education should be recognized as encompassing all of the activities supported by state funding for the delivery of higher education services to the population of a state. In each of these systems, the key decision makers are legislators, the primary objectives are pragmatic and service-oriented, and the major producers of these services are colleges and universities. Because state systems differ greatly in dimensions and organization, their planning capabilities are uneven and dissimilar.

One of the major handicaps in state system planning has been its almost total dependence upon institutional analysis. To be effective, state system planning must be redirected outward toward variables and outputs of significance to the public interest, must involve objective participants but, nevertheless, must interface realistically with institutional planning. This task is very difficult for state system planners because of basic differences between the collegial nature of institutions and the bureaucratic nature of the state.

It is predicted that statewide planning in the future will originate from centralized agencies or boards which will exercise stronger state controls over the academic community and be more responsive to the public interests. System planning will continue to use–but no longer be dependent upon–institutional analysis, which has been the only resource available to them in the past. Systems may well depart from traditional forms of operation and recruit services from many producers besides public colleges and universities. Even a de-emphasis of state boundaries could occur if funding sources shift sufficiently.

Now models are needed for system planning which, aided by comprehensive information systems, simulation techniques, and computerization, will enable system planners to develop their own unique and sophisticated tools. Again, the directions and strengths of state system planning will evolve from the changing nature of the planning agency.

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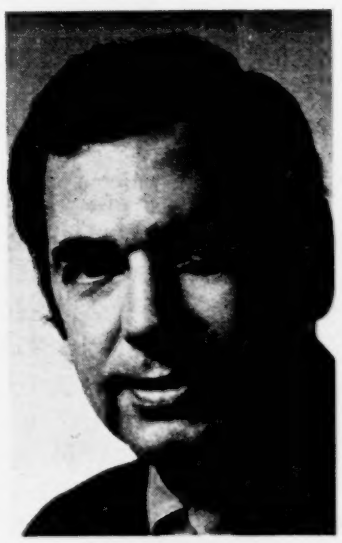
THE USES OF MANAGEMENT INFORMATION SYSTEMS IN STATE SYSTEMS OF HIGHER EDUCATION



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We have learned that significant investments in computers and data processing technology do not automatically improve management capabilities. But we have not learned more subtle lessons: that there is a difference between operating-level management information systems and planning-level management information systems—a difference between data and information—and a difference between management information systems for institutions and management information systems for state systems of higher education.

The purpose of this paper is to explore some of these differences and to gain a deeper understanding of the development of management information systems for institutions and state systems of higher education.

A major problem confronting top-level decision makers in higher education today—particularly those at the state level—is that there is an abundance of data but very little information, interpretation, and insight. For some time now, administrators have derided the analytical purists for the arbitrary distinction they have drawn between data and information. Most of us have said, "Data are information when they provide me with information." It has become obvious, with the advent of sophisticated electronic data processing

systems, that administrators must pay increasing attention to the distinctions that our analysts have been trying to make. When do data become information? Most people looking at a comprehensive road map would comment, "This provides us with a great deal of useful information." The purist will respond, "It only provides you with data until you have designated where you are going."

The expression, "If you don't know where you are going, any road will get you there," is very true. We may collect a mountain of data that will enable us to draw an intricate road map for higher education, but planning decision number one cannot be made until we know where we are going and where we are now. If we don't know where we are going, any road–anyone's plan–will get us there. In this sense, data become information when they are *related in a meaningful way* to the objectives or the problems of the decision maker.

A major task facing higher education today–particularly for administrators at the state level–is the formulation of meaningful information for decision making from the mountains of available data. In this sense, a management information system is "a system designed to convert data into information for the purposes of decision making." Information has value only in the sense that decisions are improved. Hence, a management information system is valuable only when it relates facts directly to the decisions being made.

Data can be organized in several ways to produce information. A typical approach is to summarize data to provide a description–a *descriptive summary*. For example we say an institution has 10,000 students, 600 faculty, and 1,500,000 assignable square feet of space, etc. Much statistical analysis done in higher education is descriptive.

Information can also be placed in a *comparative context*. For example, an engineering degree at Institution A costs $11,000 and an engineering degree at Institution B costs only $6,000. While there are serious attempts being made to broaden the use of comparative information, this type of analysis has thus far been limited to a few areas where comparative data have been easily obtained–e.g., faculty salaries, student-faculty ratios, assignable square feet, etc. Further, its use has been almost entirely limited to comparison of summary descriptive information.

Another way in which data can be organized–and with considerable more difficulty–is to place information in relationship to other information. This type of analysis requires the concept of analytical models. For example, using a Resource Requirements Prediction Model, given a specified increase in

enrollment, it is possible to determine the increase in faculty, support staff, physical facilities, and dollar resources required for the additional enrollment. Further, by understanding and changing the relationship between these pieces of information, it may be possible to identify more desirable mixes of faculty, support staff, physical facilities, etc., or more desirable application of the dollar resources available. This latter organization of data is at the heart of present developments in management information systems.

Thus, when data are organized, they become information usable for decisions. A management information system should be designed to organize data to make them usable by decision makers.

Characteristics of Management Information Systems

The words "management information system" mean different things to different people. To some people, they mean the management of information or a particular kind of data processing. To others, they suggest information for use by management. Still others include both meanings in their concept. *"Information Systems"* is a generic term used to describe a wide variety of activities. Part of the confusion that administrators face is the lack of consistency in the use of terminology pertaining to information systems. It may be useful here to distinguish between operational-level management information systems and planning-level management information systems, while at the same time recognizing that present trends in this information science indicate that the terminology will be obsolete within 5 to 10 years.

Operational-level management information systems refer to those activities of gathering information needed for the day-to-day operation of an institution of higher education. For example, consider the student information system, the registration system, the payroll system, the personnel information system, etc. Each of these systems generates information for the purpose of conducting the business of a particular area of *activity* in the institution. A registration system is designed to register students in classes and courses. A student information system is designed to maintain records concerning the student which show his progress through the institution. These systems are operational—they are designed to carry out existing policy rather than to make decisions concerning development of new plans. They are designed for carrying out financial plans, as opposed to determining what the financial plans should be.

To the top-level management policy decison maker, the information generated by operational-level management information systems is really

data. Of course, at the operational level, those same data are informaton–but to the top-level management that information without appropriate analysis and interpretation is only data.

A *planning-level* management information system should analyze data from operational-level systems (together with some unique data required for top management purposes only) and make it available to the decision maker to assist him in making programmatic decisions and in developing financial plans to implement those programmatic decisions. It should, in turn, provide information that would assist those same decision makers in determining the extent to which the plan is successfully being implemented. It should assist in determining which activities should be undertaken in order to implement the plan more successfully and to indicate where that plan should be modified in light of experience. In this sense, then, a planning-level management information system utilizes data generated by an operational-level information system to generate information that is relevant to the objectives and/or problems of the institution of higher education which must be faced by the decision maker. It is important to note that a planning-level management information system in this sense is largely–if not completely–dependent upon the successful operation of one or more operational-level management information systems.

Why will this terminology be obsolete in 5 to 10 years? Because the art of information science is developing in such a way that it will be technically possible and economically feasible to have a totally integrated information system in 5 to 10 years. A totally integrated information system is one in which raw data are collected and stored for subsequent retrieval and analysis into meaningful information for use at: (1) the operational level within the institution, (2) the decision-making level within the institution, and (3) the state level within the system of higher education. It is organized in such a way that the system may be looked upon as an entity rather than as several individual systems developed for different purposes. While the development of such totally integrated systems presents formidable technical difficulties and is economically impractical for most institutions and agencies, the technical capability for this development is available. Project INFO at Stanford University pioneers the way in the development of a totally integrated information system. Stanford's experience, coupled with the development of management information systems as I have described them, is contributing to the long-range development of economically feasible, totally integrated information systems.

What does a planning-level management information system look like in the sense that is used in this paper? A totally integrated system looks much like

an assembly line in a factory in which data move along through the system and are analyzed in different ways for different purposes. It is slightly different than an automated assembly line in that intermediate products come off the line at different points for different purposes. An intermediate product may be just as important and just as useful as the end product, whereas in an automated assembly line, for example, the intermediate products are few, if any, and not nearly as important as the end product.

A planning-level management information system, on the other hand, utilizes information generated by the operational-level information system in much the same way that a cabinet shop utilizes lumber from a timber mill or a navigator of an airplane uses information generated by the weather bureau. The cabinet shop does not go into the forest and cut down a tree and saw it up into lumber for use in a cabinet shop, nor does a navigator send up weather balloons and take readings on the weather. They work with materials or information cut to certain specifications for their particular purposes. They modify these materials or interpret this information to apply to the particular problem or objective they have in mind. In the same way, a planning-level management information system utilizes data generated by the operational-level information system to develop information that can be related meaningfully to the objectives or problems of the decision maker.

Given current economic feasibility limits, the analogy may be pushed a little further. The cabinetmaker uses lumber cut to specified sizes. By feeding this precut lumber into specific machines, he produces the components for furniture or cabinets as desired. Using other techniques or machines, he assembles these components into a finished product. In a cabinet shop, these machines and processes are specifically identifiable, even though they may be interrelated in such a way as to resemble an assembly line. Given the present state of development of management information systems science, a number of analytical tools have been developed into which data of given specifications can be fed so as to be analyzed for use by the decision maker. While it is feasible that each of these analytical tools be arrayed in such a way as to resemble an assembly line, given our present state of development, each of these analytical tools is easily identified as a single analytical tool in much the same way as a bench saw, a drill press, or a shaper in a cabinet shop are easily identified as single tools. As totally integrated information systems are developed, the distinctions between individual analytical tools will become less and less distinct, except to the information system technician.

It is important to note that we do not need to wait for the development of totally integrated information systems to enjoy the benefits of these

analytical tools. If information can be obtained in accordance with prescribed standards, several individual analytical techniques will be useful to the decision makers in higher education.

For the next several years, *management* information systems at the statewide level will consist of one or more analytical tools. Data supplied from the *operational-level* and *planning-level* management information systems of the institutions, together with some data specifically gathered for statewide planning purposes, will be fed into these analytical tools to produce information relevant to the statewide decision maker. It should also be noted that the data necessary to drive these analytical tools will probably be more than sufficient for a statewide agency to meet its normal survey reporting requirements.

What are some of these analytical techniques or tools that can be applied to state systems of higher education?

It is important to realize that analytical tools will have varying degrees of utility depending upon the responsibilities of the state system involved. For example, a coordinating board without budgetary responsibility will need less analytical capability than will a board with budgetary responsibility. It is best to describe the analytical tools and techniques and leave it up to the respective agencies to determine which would best serve their purposes.

The Resource Requirements Prediction Model is just what its title implies–a computer simulation program that predicts the resources required in an institution of higher education, given certain decisions made by the decision maker. Its advantages rest in the speed of the computer. Since the computer works very rapidly, the decision maker can say to the computer, "What happens if I do this?" and obtain a good approximation very rapidly at very little cost. For example, what happens if I change the student faculty ratio from 16 to 1 to 19 to 1? What happens if I change the enrollment from 20,000 to 21,000? Through the use of trial-and-error techniques, the administrator may limit his budget to $40,000,000 and then ask the computer simulation program a number of questions in order to determine the most desirable use of that $40,000,000.

The Resource Requirements Prediction Model is limited, in that it is based on the assumption of the current operating style of the institution of higher education. A radically different operating style for any given institution would require a different model. For example, if it were decided not to have classes, current Resource Requirements Prediction Models would probably be

invalid. Given the general configuration of institutions of higher education existing today, however, the Resource Requirements Prediction Model will enable administrators to predict with reasonable accuracy for Year 2 through Year 10 the resource needs in terms of dollars, faculty, physical facilities, etc., required for any given enrollment or to consider reasonable alternations in the configuration of the operating style of the institution. A coordinating board concerned with the budgetary operation of an institution would be in a much better position to understand the effect that a given budgetary decision would have on an institution if it had access to a Resource Requirements Prediction Model for each of its institutions. The board's capability for improved management decision making would, however, be further increased by the development of a statewide Resource Requirements Prediction Model which would, in effect, be a composite model of all of the Resource Requirements Prediction Models of each of the institutions under its jurisdiction. For example, through trial-and-error inquiry of a statewide Resource Requirements Prediction Model, a coordinating board could determine a set of feasible alternatives for opening a new PhD program. Such an inquiry could also assist in determining which institution it would be most economically feasible to the state for students to attend, given the resources already available.

A Program Classification Structure is a model of an institution's goals and functions. It provides a structure for the aggregation of information. Through the use of a common Program Classification Structure, it facilitates the comparison of information among institutions.

A major problem that coordinating agencies face is making reasonable comparisons of institutional programs. A Program Classification Structure, appropriately applied to each institution, provides a common currency of information exchange that makes it possible to compare programs within institutions with some reasonable degree of accuracy. Given a common data base and Program Classification Structure, a coordinating agency can make comparisons between each of the institutions under its jurisdiction by requesting the information in the appropriately prescribed format. The nature of the Program Classification Structure would enable institutions of higher education to produce unit cost information by academic program with a reasonable degree of accuracy.

Student Flow Model

The Resource Requirements Prediction Model at the statewide level of operation would be greatly enhanced by some understanding of student flows. For a long time, institutions of higher education have tried to predict

the number of students who will be enrolling in their institutions. Institutions of higher education have become so large and complex, however, that it is now necessary to understand enrollment patterns not only as they exist among institutions, but also as they occur in academic areas within institutions. In the first place, we need a student flow model, such as the one currently being developed by the Western Interstate Commission for Higher Education, which will assist the institution in determining the kinds of programmatic loads that will be induced by students entering institutions in the various academic instructional areas. Which majors are students most likely to elect? In which courses are students most likely to enroll? If we can predict answers to those questions with reasonable accuracy, the Resource Requirements Prediction Model will be even more reliable than presently planned.

For the statewide coordinating agency, however, an interinstitutional student flow model would greatly enhance the agency's understanding of the adequacy with which higher education opportunity is provided to the state. Given that each institution had a student flow model which would predict the courses and programs required by the students and that there existed an interinstitutional student flow model that would indicate the courses and programs required by students across the state, coordinating agencies would be better able to predict the resources required to provide for education and to suggest the appropriate locations for the courses and programs across the state.

Future Developments

Other analytic tools which may be developed in the near future include utilization models for space and faculty, education demand models, and research program models.

As progress is made toward totally integrated management information systems, we can expect to see a differentiation between institutional management information systems and state management information systems. Just as modifications to basic models will be developed to meet the unique needs of dissimilar institutions, so models will be developed that will relate data to the problems facing decision makers at the state level.

Cost Implications

A serious deterrent to the development of management information systems–particularly planning-level management information systems–is the cost. It may be expected that this cost factor will be reduced in the future as

operational-level systems become more common and as cooperative efforts are utilized to develop the analytic tools required for planning-level management information systems. As state and federal reporting requirements increase and as institutions become more complex, operational-level management information systems become more commonplace and the costs of operation decline, relative to the amount of information supplied. Since planning-level management information systems are dependent upon data from the operational systems, the marginal costs of operating the planning-level system will be reduced to a more acceptable range.

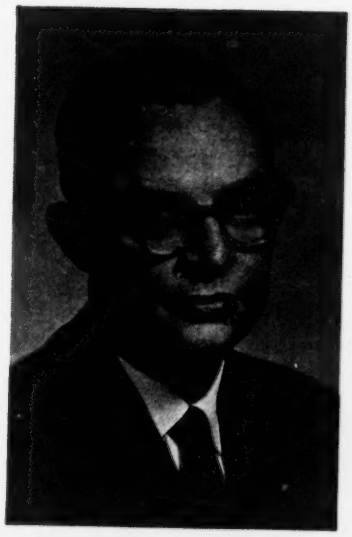
In addition, the high cost of developing analytical tools–Resource Requirements Prediction Models, student flow models, etc.–can be reduced through the cooperative development of basic models such as the effort coordinated by the Western Interstate Commission for Higher Education. Institutions and state agencies utilizing such cooperatively developed tools can substantially reduce the investment cost–not eliminate it, mind you, because they must modify and implement–bringing the cost of development and operation within the realm of practicality.

A Final Note

It is interesting to note that state systems of higher education may be one of the greatest, if not *the* greatest, beneficiaries of planning-level management information systems. Planning-level systems become more useful as complexity increases and the opportunity for personal, first-hand experience and understanding on the part of the decision maker decreases. The most highly intentioned, humanistic, state-level decision maker cannot avail himself of all the first-hand information necessary to make the decisions defined by his responsibilities. On the other hand, the decision maker who is guided by the significant information provided through a good management information system will understand the effects of his decisions as they relate to individuals within his institution. His decisions will reflect greater awareness. Planning-level management information systems offer this hope.

It is clear that state systems will depend to a large degree on the data which are produced by the individual institution. Therefore, the development of management information systems for higher education should be focused on improved information systems at the institutional level and the development of management analytic tools for use at the state level. Unfortunately, this approach gives little incentive to the institutions. The impetus necessary to persuade our institutions of higher education to adopt and use management information systems will come only when we offer them the precise, effective, useful analytical tools they need to implement these systems.

THE ROLE OF THE STATE SCHOLARSHIP PROGRAM IN THE STATE SYSTEM OF HIGHER EDUCATION



Joseph D. Boyd
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It is significant and gratifying to note that a consideration of student financial aid programs is included in a seminar on the general topic of coordination in higher education. Long-range planning, the financing of higher education, the attempt to provide universal access, and the desire to preserve wholesome diversity in higher education are all ramifications of large-scale student aid programs as well as related to a state's efforts to provide individual student as well as general support to the enterprise of postsecondary education.

Allow me to divide my presentation into two parts:

1. First, what comprehensive state scholarship programs now exist? what purposes do they now serve? what purposes may they eventually serve?

2. Second, what role can the information being gathered by state scholarship programs play in the management information decisions and coordination of the future?

For the past nine enjoyable years, I have been involved with a special form of a "general welfare" program which I believe has made a significant difference

in the general state of health of all higher education institutions in Illinois. Certain other states could tell a similar story. We who administer comprehensive programs are convinced that we are simultaneously serving needy students, colleges and universities, and society in general.

Let me define what I mean when I speak of a state scholarship program. I mean a comprehensive state-sponsored program of nonrepayable undergraduate scholarship or grant assistance (gift assistance) with awards applicable at both public and nonpublic or solely to nonpublic institutions of higher education. All such comprehensive state programs will have student financial need a common eligibility criterion in qualifying for a monetary award. Some measure or measures of academic potential are also used to determine those qualifying for consideration in scholarship programs. Grant programs are more often noncompetitive.

Today, the states of California, Connecticut, Illinois, Indiana, Iowa, Kansas, Maine, Maryland, Massachusetts, Michigan, Minnesota, New Jersey, New York, Ohio, Oregon, Pennsylvania, Rhode Island, Vermont, West Virginia, and Wisconsin have general programs of undergraduate assistance applicable to both public and nonpublic institutions of higher education. (A summary of the programs by state is included as an appendix to this presentation.) For what I consider a minimum portion of the total dollars invested as compared with all higher education operating costs in the United States in 1969-70, a great deal of benefit has been realized. The 20 states made approximately 505,000 monetary awards totaling about $200,000,000 during this past academic year. This dollar investment represents only 3.3 percent of the total state dollars appropriated for the operational costs of all of higher education. The percentage increases to 5.3 percent when one compares the comprehensive scholarship and grant program appropriations with the total higher education operational costs in only the 20 states with programs.

A further analysis of the 20 states shows the following facts as reported for best estimates as of December 31, 1967, by *Sales Management Inc.:*

1. They have 61.6 percent of the U.S. population.

2. They possess 67 percent of the U.S. effective buying power.

3. They make 64.5 percent of the U.S. retail sales.

The wealthy and highly industrialized states have been the ones to adopt state scholarship programs. Certain inequalities based on state of residence are

operating to keep us from reaching a national purpose of removing financial barriers and providing universal access. It is also of interest to note that three states (New York, Pennsylvania, and Illinois) were responsible for 68 percent of the $200,000,000 scholarship and grant funds invested in students in 1969-70. These three states have 20.5 percent of the U.S. population, 23 percent of the buying power, and 21.3 percent of the retail sales.

Another matter of fact is the positive means by which the parents and student beneficiaries of a state award see the immediate and visible effect of a tax dollar working for their welfare and interest. It must further be said that legislators do not hesitate to also point out to students and parents the important role the legislators played to make this benefit possible. It permits many lawmakers to have a special kind of direct contact with a home which otherwise is often oblivious to their identity or concerns.

The type of programs I represent exist to permit freedom of college choice. They proclaim that diversity (strong public and strong nonpublic institutions) is a significant source of strength to the state and country. This thrust is in contrast to most federal programs of student aid where the assurance of some college opportunity and not necessarily freedom of college choice is the predominant purpose.

Most states use financial need formulae which compare a wide range of family sizes, incomes, and assets with a specific college cost budget to determine financial need. A variety of human circumstances is reviewed in the determination of financial need. Most federal programs of student aid requiring need assessment have been sensitive mainly to family income and often disregard the fact that need can be relative to college choice.

Also, when one compares state-operated programs with direct institutional-administered assistance, the following basic differences appear evident: The central state agency permits a more standard appraisal of financial need and also gives flexibility of college choice. Consistency, efficiency, and better communicated opportunity are also more likely to occur in centralized financial aid operations. College-administered aid programs do, however, permit certain other desired flexibilities and an opportunity to know students as persons and not simply another applicant on paper.

No two of the programs, however, are identical. Comprehensive programs are in a state of dynamic change. They do have some common characteristics. They are supported by and authorized by an act of the legislature, open only to residents of the respective state, and assess need of the applicant before an investment of dollars in the recipient.

To encourage diversity of choice, most of the comprehensive state programs have limited their maximum awards to not exceed tuition and fees. For example, in Illinois a full-need student received about $400 in gift assistance at a public college and $1,200 at a nonpublic college from our Commission in 1970-71. This limitation has permitted many states to invest in students attending nonpublic colleges, and thereby indirectly contribute to their support and general welfare. Broad state programs have been a response to the support of states to promote the continuation and role of independent and private institutions.

A common thread of all development is to provide dollars to permit the financially needy student to attend the college of his choice without designating a specific vocational future. Each state must decide who is to be admitted and then provide the dollars and facilities to permit the implementation of their admission.

An examination of the purposes (historic, evolving, and long-range) of the state programs helps give understanding as to what they can attempt to achieve. It also provides a means to see how they relate to all planning for higher education.

Historic Purposes

A. To remove financial barriers to college attendance.

B. To expand freedom of college choice and thereby preserve diversity in higher education. To change the enrollment plans of thousands of students from a public college choice to a nonpublic choice, thereby saving the taxpayers general support costs and using the otherwise unfilled spaces at nonpublic institutions.

C. To permit students to enroll in a college because of its program and desirability and not because of its "price tag."

D. To allow all colleges to have a broader cross-section, if desired, of students from a family economic point of view.

E. To supplement other forms of gift assistance received by the student.

Evolving Purposes

A. To provide nonrepayable gift investments in all financially needy students regardless of measured academic potential or high school record.

B. To provide gift assistance support to needy students facing ever-increasing tuition costs at public junior or senior institutions, while simultaneously reducing the taxpayers' *general* support of all students.

C. To provide a means by which all students now holding or potentially qualifying for a categorical award (given for a specific purpose other than need) be asked to apply for an award based upon need and require them to pay their own way if they or their parents are financially able.

Long-Range Considerations

(At various degrees of decision in the respective states)

A. Are foregone earnings, the largest cost of postsecondary education, to be replaced in the future in those families where the loss of such earnings significantly affects the total family economic well-being?

B. Should part-time students benefit from scholarships or grants?

C. Should the state provide general nonrepayable gift assistance at the *graduate* level?

D. Should the list of approved institutions for grants and scholarships be extended to include the nonprofit and "for profit" vocational, technical, or specialized schools?

E. Should monetary awards be used for out-of-state college attendance?

F. Should each state become actively involved in the development of reciprocity agreements with other states providing similar scholarship or grant programs?

G. Are adults with families to be given special total college cost consideration in providing opportunities for them to become students on a full-time basis?

I highlight these purposes to emphasize one point. It is mandatory that sound philosophy, followed by acceptance of the philosophy, precede implementation.

And now, the second part of the presentation–What role can the information being gathered by state scholarship programs play in the management information decisions and coordination of the future?

The world of the computer technology and data banks must be utilized in the 1970s to better serve students, high schools, colleges, educational planners, and legislators. States or consortia of states must plan and invest funds to help answer many of the problems which massive paper handling, time delays, or limited information have created. Accountability and cost-benefit analysis are "in" words. The worlds of business and science are miles ahead of education in using the modern tools of computer technology to resolve some difficult problems.

All students, those financially needy and otherwise, can be assisted by a data system which permits immediate answers to interested publics. Test scores, high school record information, and other pertinent data should be as close as a keyboard or telephone tied to a remote on-line computer installation. High school counselors can really counsel if we are able to reduce massive clerical tasks by having people who know how to use the computer world to match student potentialities and interests with aspirations and then to instantly assess the matching of a college choice with the availability of opportunity to attend the specific choice. Relevant data in the decision-making process can and must be made more readily available.

Today, state scholarship programs all have massive data files which can be useful to decision makers. They also have a history of dealing with nonpublic high schools and nonpublic colleges in relationships not known by most other state agencies.

Among the factors which state scholarship programs can provide for study and master planning are: Measure of academic ability and differential-measured performances; the geographical distribution of family economic data; the patterns of specific college choices; studying change in college choice; the supplementary forms of student assistance; and an analytical study of the impact of state programs on college attendance and college choice. State scholarship programs can and must contribute their files of data to the development of comprehensive information systems in statewide planning. Furthermore, they must help point out the emerging need for a computer contact in every college and high school which serves the youth of the state. It appears mandatory that dollars for data-related services, beyond direct student or general support, must be provided in the closing three decades of this century. We should all strive for the centralization of relevant

data and a reduction in the duplication of efforts to serve the same student by sending information by paper in the mail. New ways to communicate are available and must be utilized.

I am aware that new ways of communicating mean new ways of "baring one's soul" to the sources which in the past were considered threatening. This is a new age. Any public or nonpublic institution in the world of education must redefine autonomy as it seeks the help from the "public purse" to remain alive and relevant in the future.

Who should finance the costs of postsecondary education is a question under frequent review and with a myriad of possible answers. I offer my own viewpoint. Both federal and state governments should provide broad general support. Student financial aid, both federal and state, should be available in large amounts to financially needy applicants. The parents of any applicant under 23 years of age should be expected to make a reasonable sacrifice of their resources and the student should be expected to contribute to college costs through self-help by summer and term-time earnings and/or modest ($500) per-year borrowing.

In a time of phenomenal growth of enrollments with the related facts of open access to admission, curriculum change, campus unrest on the question of governance, and the continuation of diversity in type institutions, the efforts of each state take on even greater importance as we plan and build programs to meet future needs. The development of our human resources should be our highest priority of national concern!

What is needed is a public commitment of funds so substantial as to make it pure rationalization for any student to say that he simply cannot afford the cost of any higher education.

State programs not only permit college-going to those who might not be financially able to attend, but also significantly affect college choice. Freedom of choice and the preservation of diversity in higher education have motivated the large and comprehensive state programs.

The existence of financial need to attend the postsecondary institution of the student's choice is the developing single criterion of emerging state programs. The economically disadvantaged, not merely the talented, are the focus of new programs. Talent search, early identification, and decision making based upon assured financial assistance are all required. To assist poor people to rise on the economic ladder requires financial gift aid for college available to the

true disadvantaged. Dollars invested in average or "on paper" poor-risk students is the new and frequent response to enhancing educational opportunity.

We can build on existing programs. The federal government should encourage, not substitute, the nonfederal sources. Certain incentives, or "seed money," must be provided to motivate the 30 states without comprehensive programs. It is tragically true that low-income students are more frequently found in states with low fiscal capacity.

The unique characteristic of the higher education system of the United States is to provide for *all* citizens the freedom of going and freedom of college choice, without the barrier of insufficient dollars available to realize their self-fulfillment.

State scholarship programs are proving to be a relevant and effective response to how do we both open and permit entry to the doors of opportunity in order to derive benefits both for the individual and society.

APPENDIX

Summary of All Comprehensive Undergraduate State Programs (Competitive and Noncompetitive) for Residents of the State to Attend Either Public or Nonpublic Colleges or Universities

	For 1969-70				
State	*Total $s Appropriated*	*% of Total*	*Number of Awards*	*% of Total*	*Average Award*
California	$ 12,288,475	6.1	14,680	2.9	$837
Connecticut	877,500	.4	1,440	.3	609
Illinois	26,000,000	13.0	38,475	7.6	676
Indiana	3,080,000	1.5	6,550	1.3	470
Iowa	1,762,500	.9	2,275	.5	775
Kansas	150,000	.08	409	.08	367
Maine	61,000	.03	150	.03	407
Maryland	2,900,000	1.5	7,250	1.4	400
Massachusetts	2,000,000	1.0	3,000	.6	667
Michigan	12,500,000	6.3	24,030	4.8	526
Minnesota	775,000	.4	1,293	.3	603
New Jersey	11,850,000	5.9	26,658	5.3	445
New York	58,800,000	29.4	263,000	52.1	224
Ohio	8,500,000	4.3	17,000	3.4	500
Oregon	815,400	.4	6,961	1.4	117
Pennsylvania	51,900,000	25.9	77,400	15.3	671
Rhode Island	1,500,000	.8	2,000	.4	750
Vermont	1,099,255	.6	2,100	.4	523
West Virginia	175,000	.09	625	.1	280
Wisconsin	2,950,000	1.5	9,510	1.9	350
TOTALS	$199,984,130	100.0	504,806	100.0	$396

COMPREHENSIVE INFORMATION SYSTEMS FOR STATEWIDE PLANNING IN HIGHER EDUCATION: SOME PROSPECTS AND CRITICAL CONCERNS

Fred F. Harcleroad
President,
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College Testing Program

In 1959 Lyman Glenny, in his now classic study on state coordination (*Autonomy of Public Colleges, the Challenge of Coordination*), described three different patterns of organization: (1) a single board, legislatively or constitutionally established to coordinate and govern all public institutions of higher learning within a state; (2) a board or agency legislatively established with limited coordination powers, restrained from exercising governing controls; and (3) a voluntary system involving representatives of each institution which attempts to coordinate certain aspects of their operations, usually as a basis for budget requests to the state legislature. A decade later, in 1970, voluntary coordination had practically vanished and the number of statewide coordinating agencies with governing powers was rapidly increasing.

The move to "super-boards" with governing powers has been a concern of higher education for years. The case for concern was well stated by President J. L. Morrill of the University of Minnesota in his 1958 address to the State Universities, in which he said:

> It is the newer super-fiscal coordinating board, created in the supposed interest of "efficiency and economy," with the single idea of holding down state appropriations,

usurping the authority of long experienced institutional state university boards of trustees and regents long-accustomed to know their own institutions and live with their responsibilities day by day and year after year, that I fear. I can foresee in their operations the leveling down of the strong to level up the weaker in response to political pressures. I can foresee the invasion of institutional autonomy by governors and budget officers. . . .

His fears of over a decade ago were well-founded and the problems he foresaw in centralized coordination have come to pass in many states. The primary reason for this fundamental change has been the increasing enrollments in higher education in recent years, which have created astronomical increases in costs. Higher education funding has become a major part of each state's budget and an increasingly important part of the federal budget. In addition, there have been special added costs for developing new institutions. Likewise, competitive struggles between institutions or groups of institutions have led to widespread duplication of educational programs. Finally, depressed financial conditions during the recent economic recession have placed special demands for efficiency and accountability on all public institutions, including colleges and universities.

With this trend to accountability, college administrators and professors are having to learn the problems of working with coordinating agencies, and to cooperate with them in order to meet the increasing financial and planning problems to be faced in the '70s. Without this cooperation the necessary funds will be even more difficult to obtain.

If individual colleges and universities are to operate as dynamic institutions, a clear distribution of responsibilities must be worked out. The work of the coordinating board and its staff and the responsibilities and authority of the administration and faculty on individual campuses must be carefully delineated. The following model of duties and responsibilities for a coordinating agency or board may become more and more prevalent within the next decade. Twenty states already approximate this model very closely and legislatures in other states appear to be moving toward it. Hopefully, section four of the model will be recognized as a basic consideration, even by statewide governing agencies and boards. Although there are many deviations in specifics from such a generalized model, the framework is important in understanding the coming demands for organized information about almost anything going on within individual campuses.

A Possible Model Role for a Statewide Coordinating Agency

1. *Leadership and coordination in (a) long-range planning, (b) formulation of statewide policies, (c) program development with statewide implica-*

tions, and (d) master plans for the development of program and physical facilities at individual institutions. This includes the development of guidelines, standards, and, occasionally, basic procedures to guide the operations of individual institutions.

2. *Approval of institutional objectives on which to base yearly institutional budget requests, consistent with statewide planning, guidelines, and previously approved college master plans.* Recommendation of the agreed-upon budget to the statewide board and organization of the presentations and support of the budget requests to the executive and legislative branches of government.

3. *Appraisal and evaluation of institutional achievement of approved objectives, including fiscal postaudit and analysis of institutional application of statewide policies and guidelines.* This includes a periodic review of institutional progress in achieving agreed-upon objectives and in solving problems inherent in the local situation.

4. *Advice to individual institutions, as needed and requested, on operational matters.* Responsibility and authority for operational decisions necessary for institutional implementation of systemwide policies and programs, as well as institutional policies and programs, should be located on each campus. Statewide officers have an obligation to restrict their role to statewide activities.

The most critical problem in any discussion of relationships between educational institutions and coordinating boards and agencies turns on the question of centralized authority for campus operations (in contrast with long-range planning, for example) versus local autonomy for institutions. This problem has been, is, and will continue to be the great issue contributing to constant stresses and strains. The public interest, which must be recognized by public institutions, and the need for institutional and scholarly autonomy come into conflict at many points, and nowhere is this more critical than in the development of a comprehensive systemwide information system. Knowledge (information) is power and prior information usually results in prior power. The demand for additional information by coordinating boards and their staffs can be expected to grow—and grow—and grow. There are a number of attempts to develop such organized information systems. The best known and most complete is the work of the Planning and Management Systems Division of the Western Interstate Commission on Higher Education. Goodwill and careful attention to information system development will be most important in the continuing refinement and expansion of the comprehensive systems developed for use in statewide systems.

A number of concerns regarding comprehensive information systems were expressed by participants in the seminar. Ten of the most critical of these are as follows:

1. With new models of state governance of higher education emerging, statewide planning and coordination of higher education is and will continue to be more formalized and more bureaucratic, but hopefully more functional. The key problem revolves around the question, "Can higher education endure the transformation, simultaneously achieving excellence and optimum returns on the dollar spent to support it?" Interinstitutional data provide a basis for comparison of *like* institutions. It can provide evidence of their efficiency in the "process" of providing higher education, by analysis of their constraints (their inputs or limits) and of the results (consequences or outputs).

2. Through an information system with common data elements, the segments or campuses in a system should be able to speak to each other in a common language, a great advantage to all concerned.

3. A comprehensive information system, including a Resource Requirements Prediction Model, can provide decision makers with a variety of options, an array of possible alternatives. The big question arises when the information system is expected to "optimize" the data and provide *the* option which should be selected. "Optimizing" in a simulation model of colleges or universities appears to be far down the development road, possibly 10 or 20 years. The danger in a comprehensive information system is attempting to include a viable and complete value system in the model. It is critical that people in the institutions involved continue to supply the value judgments which are a necessary prior determinant in final analysis of the available data and selection of the most promising option or alternative.

4. Members of the executive and administrative branches of state government may have quite different sets of values than educators in the state's postsecondary institutions. A clear understanding of possible differences in value systems and potential value judgments is critical in the development of a comprehensive information system, including the fundamental assumptions and the basic nomenclature or taxonomy.

5. Comparison of unlike institutions by established criterion measures may be difficult with the same information system. At least, the information system should recognize potential differences in institutional missions in

establishing the various output measures which will be produced. The relative value of various functions or missions to the public and the state must be a basic consideration in the development of the information system. A qualitative evaluation will be required in addition to the quantitative data, in order to recognize this need.

6. The information system must make it possible to assess what happens after the institution or statewide agency has been committed to a particular course of action. It must provide a way to answer the question, "Did the option work?" Feedback loops must be planned with the follow-up analysis in mind in order to answer this question.

7. Ideally, simulation models within the information system will include (a) recognition of the needs of society, (b) the needs of the student as he wishes an institution to fulfill them, and (c) whether the student's education will mesh with the opportunities for the student to perform satisfactorily in the society after completion of a program provided at one of the institutions.

8. A comprehensive information system itself must justify its costs in a clearly measurable way. In addition, regular follow-up analysis of an information system needs to be made to see whether it should be continued. Computer hardware, and the games and simulations they make possible, can become "toys" for their operators, with the constant demand for bigger computers, more programmers, and more facilities. Simulation models do not predict anything with more reliability than a statistician doing it by hand. The computing machine and a simulation model can do it much faster. Adjustment in a course of action can thus be faster with appropriate machinery and a well-planned information system. Constant checking on it is necessary in order that it continue to demonstrate that it is a justifiable expenditure.

9. An important part of any statewide plan for postsecondary education is the provision for student assistance. Twenty states with state scholarship commissions or agencies now provide scholarships, grants, and loans to students. Some provide portable aid and allow students to move across state lines. Some provide additional support for each institution taking a scholarship student. A total information system regarding higher education in a given state should provide for information sharing between state agencies or the development of a general data bank for multiple use.

10. Centralization carried to the *nth* degree means centralization of all educational matter for planning or management purposes. Eventually, there may be consolidation of efforts of all statewide agencies directly involved in the management of different facets of postsecondary education, including scholarship commissions and boards for all types of postsecondary institutions. At least, communication between all agencies will be necessary and common elements will be important to expedite such communication.

The quarter century since World War II has been an expanding boom period for almost everyone associated with higher education. Living with an upward spiraling economy gave most university professors and administrators a "heady" feeling. With higher education the goal for everybody's children and constantly rising financial support, management was relatively easy. Allan Cartter, one of higher education's most successful futurists and predictors (in 1964 he predicted the oversupply of college professors and the deterioration of support for science and scientific research, both in 1969-70), stated in 1970:

> The last frontier for rapid expansion in student bodies and the one that may be popular enough politically to attract support is reflected by the advocates of open admissions. But at present rates of expansion we will have exhausted that source of incremental growth within five to seven years. Few of us are psychologically prepared for living in a system that has reached physical maturity.

Styles of operation developed during a period of consistent growth are hard to change when the rapid growth stops and public support, both emotional and financial, tapers off. Living without expansion will demand severe readjustments in our outlook and in the manner in which resources are allocated for postsecondary education. Comprehensive information systems are developing and receiving a great deal of financial support themselves, because they can help in the allocation of resources. Postsecondary education competes with demands for welfare, improved health delivery systems, leisure time facilities, and expenses for environmental improvement and pollution control, as well as highways and other drains upon the public tax money. Information systems can be of assistance in providing accurate data with which to compete for the public dollar against these other pressing social demands. However, appropriate constraints upon information systems must be implicit in their development. Finally, people of goodwill must work together in making the critical value judgments which provide the basis for choosing among the options made available in a timely fashion by comprehensive information systems.

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Announcing the Career Planning Program. (Brochure) A description of the instruments, information services, and procedures for participating in this new ACT guidance-oriented program. Free.

College Student Profiles: Norms for the ACT Assessment. Describes students, by geographic region and institutional level, enrolled in ACT colleges and universities. $3.50, or $3.00 if check accompanies order.

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The Developing State Colleges and Universities: Historical Background, Current Status, and Future Plans, by Fred F. Harcleroad, H. Bradley Sagen, & C. Theodore Molen, Jr. Describes a project undertaken to determine the extent and kind of change that has taken place in the developing state colleges and universities in the past and is projected for the near future. $3.00.

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A collection of several special reports concerning two-year colleges and their students. The focus is on institutional characteristics, student characteristics, and predictions.

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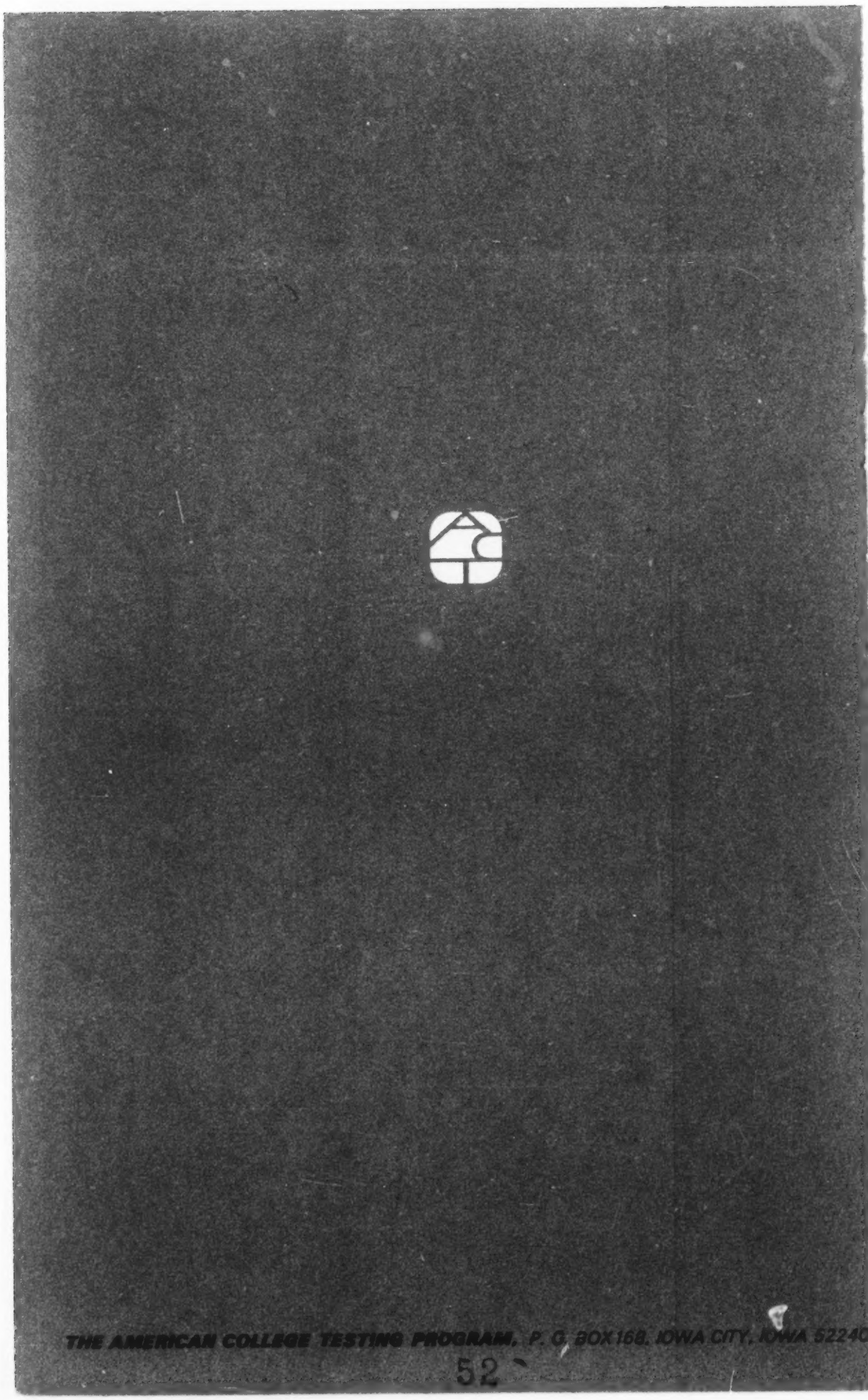

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